

Enhancing learning in the laboratory: Identifying and promoting best practice in the professional development of demonstrators

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Background



“Any discussion of science education in universities must involve the key role played by demonstrators. Demonstrators were cited as a significant factor in the laboratory experience by most students, often the most significant factor.”

Rice, J. W., Thomas, S. M., & O’Toole, P. (2009). Tertiary Science Education in the 21st Century.

For many students:



- *the demonstrators symbolised their interaction with the world of science at an immediate and practical level;*
- *the lab was a place of significant interaction with a more knowledgeable person who guided them through the complexities of lab work; and*
- *demonstrators had the power to make a lab a great or a miserable experience.*

Rice, J. W., Thomas, S. M., & O'Toole, P. (2009). Tertiary Science Education in the 21st Century.

Aims of the Fellowship



1. To develop a network of academics to run Laboratory Demonstrator Professional Development programs in their home institution/ city and champion the demonstrator as critical element in the education of science students.
2. Develop a framework for a "Certificate of Laboratory Demonstrating" to allow demonstrators to collect evidence of their good teaching practice that could be used towards recognition.

Curtin LDPD program



- (i) a full day workshop on teaching in laboratories with a focus on the educational issues and student learning,
- (ii) use of a demonstrator's preparation template to highlight educational objectives and practical issues and
- (iii) weekly group meetings to discuss teaching strategies for individual experiments.

Lab Demonstrators' Workshop



Interactive discussion based

Models good teaching practice strategies

Workshop program

- Why have labs? What is your role?
- Qualities of good/bad demonstrators
- Student expectations of demonstrators
- Laboratory scenarios
- Assessment strategies and feedback

Lab Demonstrators' Workshop

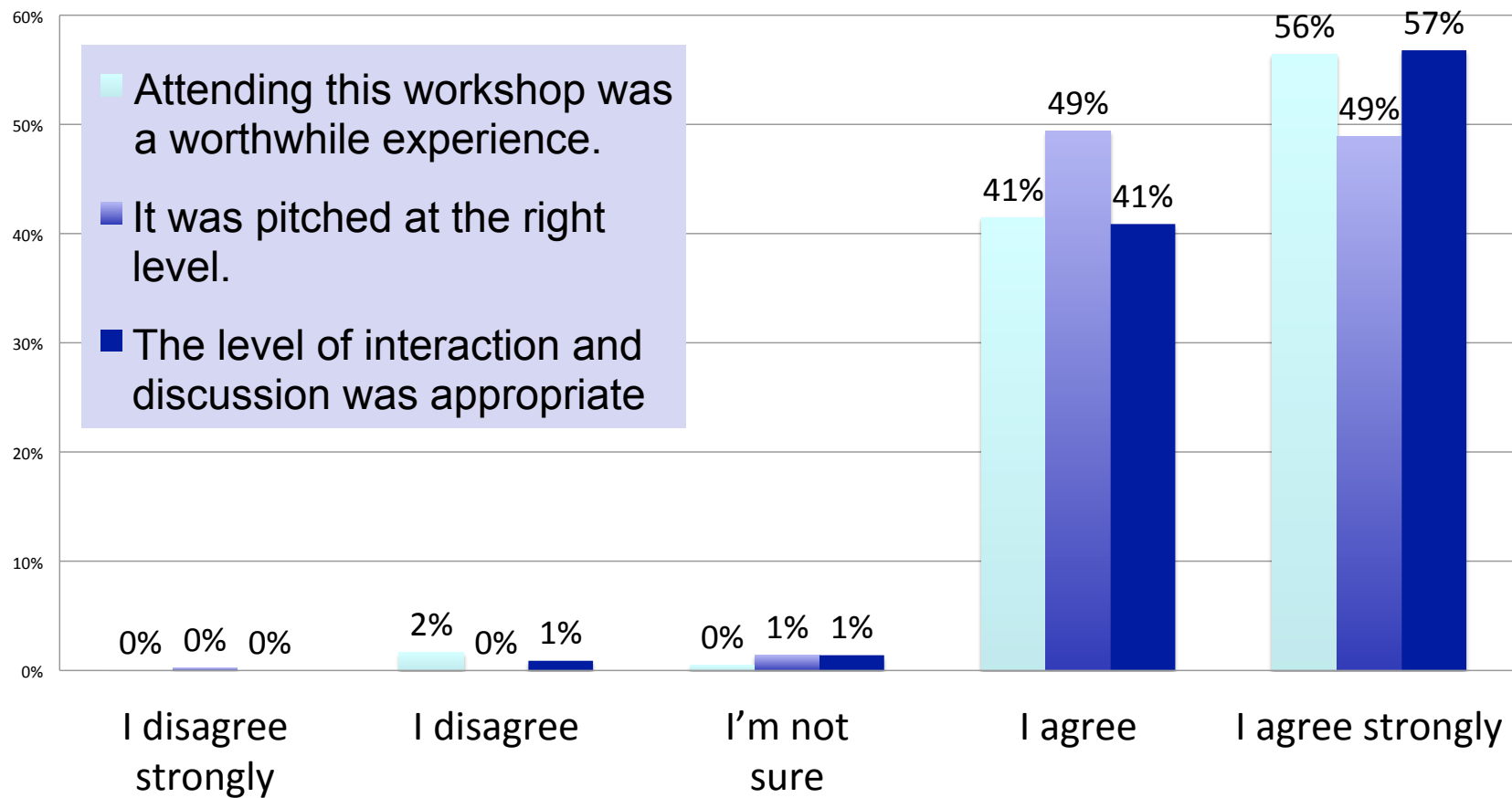


Do students learn what we think we're teaching them?

- Part 1 - Understanding learning and teaching
 - information processing model
 - language and giving instructions
 - Solenol Ditrade video
- Part 2 - *A Private Universe* video
 - preconceptions/misconceptions
 - deep and surface learning
 - effective questioning

Lab Demonstrators' Workshop

Participant evaluation of workshops



Demonstrators' preparation template



Flipped class for demonstrators

The topic headings are:

- What are the purposes of this lab for students?
- New procedures to be learned by students
- New equipment to be used by students
- Key calculations/equations used in this lab
- Possible questions to probe understanding
- Risk assessment
- Lesson plan (key stage-posts)
- Feedback to the coordinator

Weekly meeting with demonstrators

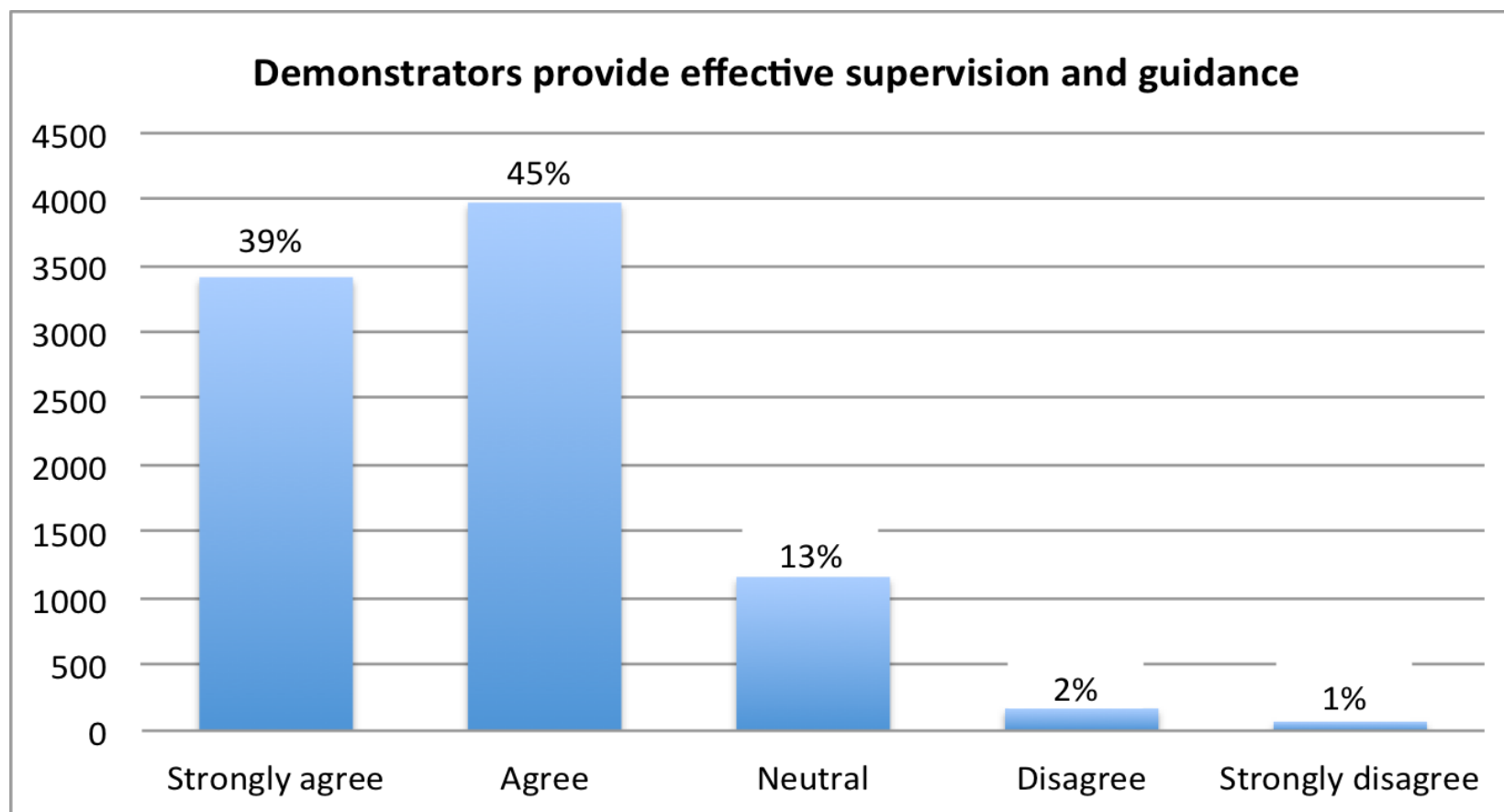


Agenda:

- Feedback from last week's lab
- Key points/issues from the prep template
- Focus is on PCK in labs
 - discussion on how to teach key concepts and common difficulties

Meetings build a community of practice; demonstrators share their experiences and provide valuable feedback to the whole group

ASELL student lab evaluation



ASLE surveys (N = 8778) of first year chemistry and physics students at Curtin

Fellowship progress



The LDPD workshop run in six new centres

- ECU - Local Champion: Ruben Phillips
- ADFA - Local Champions: Kate Wilson and David Low
- Deakin - Local Champions: Janine McBurnie, Kieran Lim and Julia Savage
- Monash - Local Champions: Yardenah Brickman, Mary-Rose Carroll and Theo Hughes
- UNSW - Local Champions: Scott Sulway, Ron Haines and Anna Choy
- UWA - Local Champion: Dino Spagnoli

Some other LDPD programs



University of Sydney

University of Adelaide

Flinders University

University of Queensland

University of Tasmania

Griffith University

Others??

Acknowledgements



Marjan Zadnik


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Jen Bearfoot

Local leaders

Office of Learning and Teaching



Copies of the workbook and slides used for
the full day workshop are available from
Mauro Mocerino

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**Thank You
Questions?**

